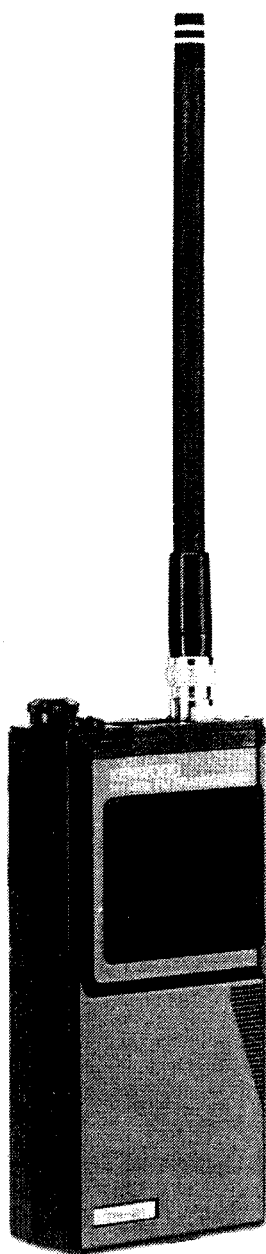


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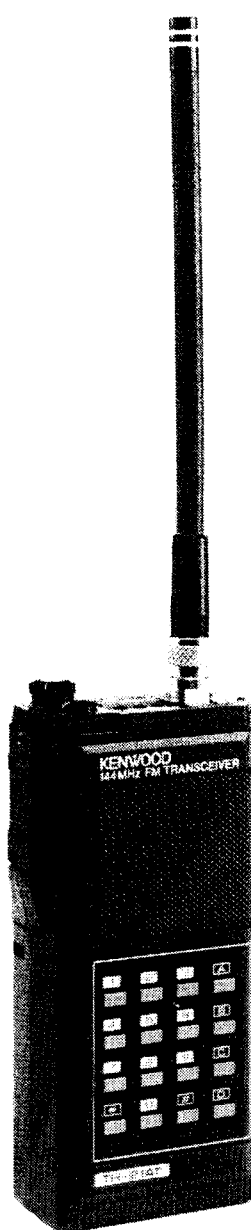
TH-21A/AT/E

144MHz FM TRANSCEIVER

Instruction Manual



TH-21A/E



TH-21AT

Accessories

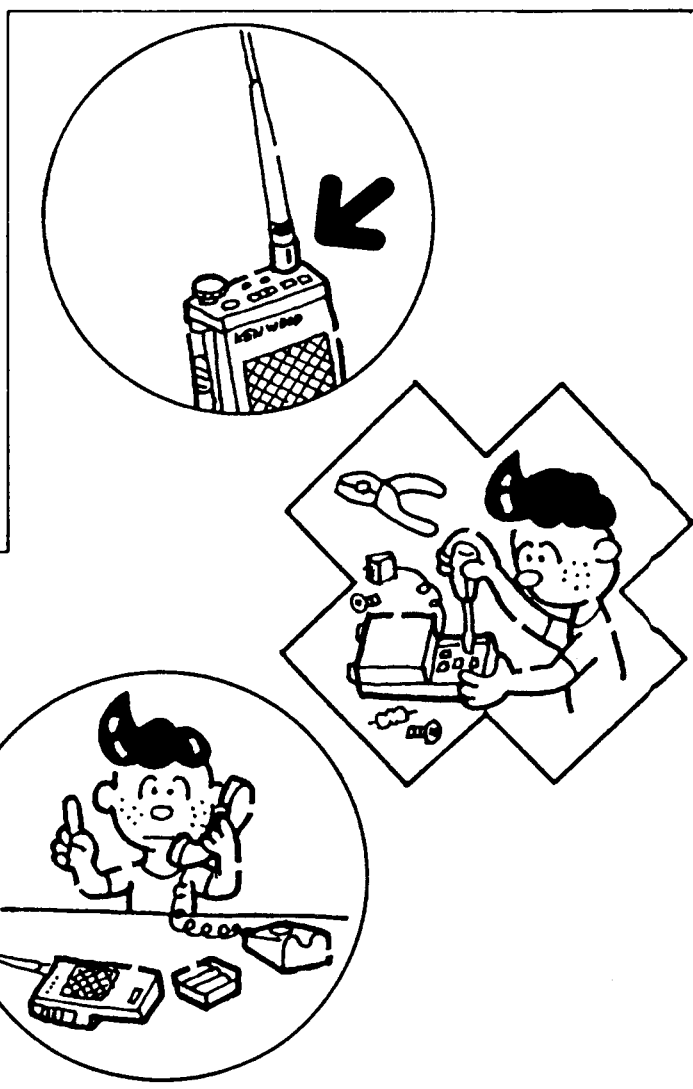
Confirm that the accessories shown below are included.

Helical antenna	1
Ni-Cd battery pack.....	1
Battery charger.....	1
Earphone (TH-21A/AT)	1
Hand strap	1
Instruction Manual	1
Warranty card (For users in USA only)	1

The carton box and packing materials should be retained for future transportation.

Before operation

- Ensure the supplied helical antenna is securely tightened.
- The trimmers and cores inside the unit are factory adjusted. Do not touch them.
- Should the unit require service, contact your authorized dealer.



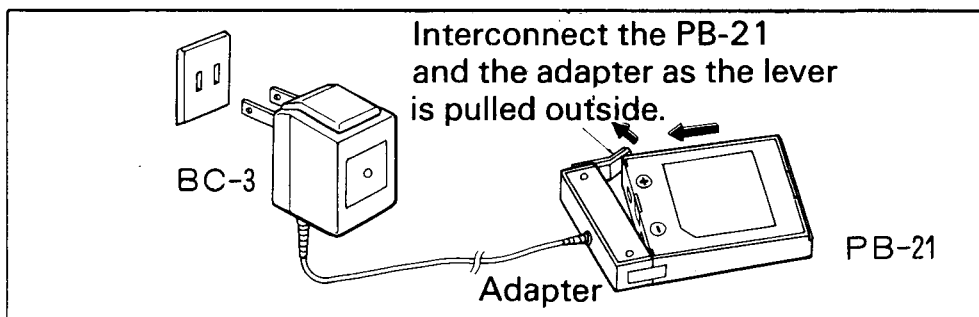
Battery notes

1. Recharging the battery pack

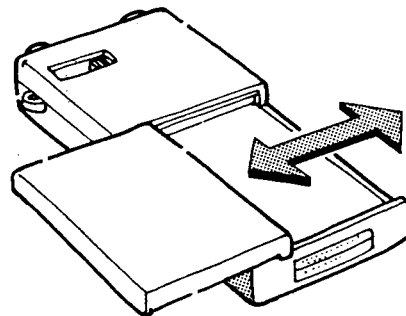
- Plug the BC-3 into the AC line outlet and interconnect the adapter to the battery pack PB-21. At this time, be sure the polarities. While recharging is correctly in progress, the red LED on the BC-3 lights. However, the LED remains lit while the BC-3 is still connected to the AC line outlet. Therefore, unplug the BC-3 after 8 hours of recharging.

Notes:

1. Recharging should be done within ambient temperature between 10°C and 40°C. Recharging performed out of this range may not fully charge the battery pack.
2. Excessive charging, if happened, the battery performance and its life may lessen.



- Align the grooves in the battery case and unit and slide in the battery case to the right. Slide to the left to remove the battery case.

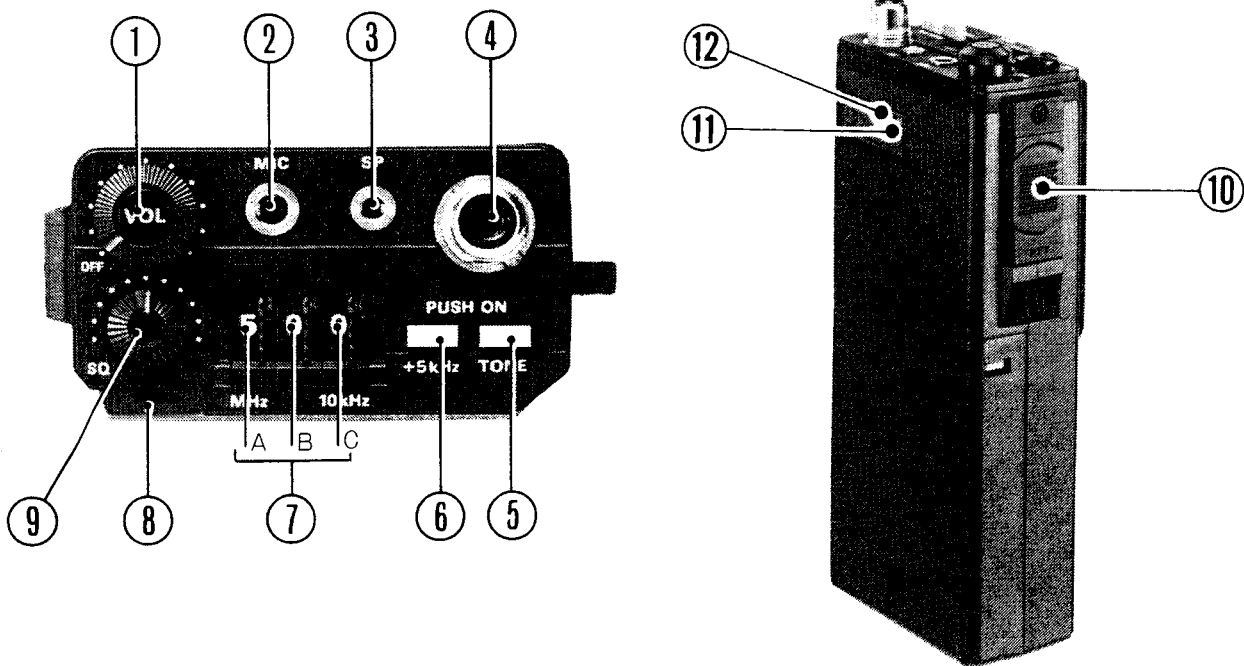


2. Operation time with AAA batteries

The operation time with a repeated 1 minute TX and 3 minute RX cycle is approximately 40 minutes with manganese batteries and about 90 minutes with alkaline manganese batteries.

To communicate over a short distance, set the Hi/Low switch to **LOW** to conserve power and thus extend operation time. When the batteries are exhausted and the **ON AIR** indicator lights dimly, replace the batteries with new ones.

Names and Functions



① VOL control (Volume control/power switch)

- This knob is dual-purpose; power switch and volume control.
- When this knob is turned clockwise, power is supplied.
- When this knob is further rotated, the volume level increases.

② MIC jack (Microphone jack)

- Used in combination with the SP jack, for connection of the optional speaker/microphone (SMC-30) or headset with VOX (HMC-1).

Do not use other microphones other than the SMC-30 and the HMC-1, or damage of the transceiver may result. (Because of DC voltage is present at the plug.)

- When the plug is inserted in this jack, the built-in microphone is automatically disconnected.

③ SP jack (Speaker jack)

- Connect an external speaker or earphone.
- Used with the MIC jack, for optional SMC-30 or HMC-1.
- When the plug is inserted in this jack, the built-in speaker is automatically disconnected.

④ Antenna connector

- Insert the supplied helical antenna and rotate to the right to secure.

- ⑤ **Tone switch**
 - Activates the optional TU-6 (TH-21A/AT).
 - Activates 1750 Hz tone (TH-21E).
- ⑥ **+5 kHz switch**
 - When the switch is ON the operating frequency is 5 kHz higher than indicated by the thumb wheel switches.
- ⑦ **Frequency setting switches (Thumb wheel switches)**
 - A..... Used to set to 1 MHz.
 - B..... Used to set to 100 kHz.
 - C..... Used to set to 10 kHz.
- ⑧ **ON AIR indicator**
 - Lights for transmission.
 - When this indicator lights dimly, replace the batteries with new ones.
- ⑨ **SQ control (Squelch control)**
 - Used to eliminate noise at non-signal condition. For normal operation, turn the knob clockwise to the point at which noise just disappears.
- ⑩ **PTT switch (Press-To-Talk switch)**
 - Press this switch and speak into the micro phone for transmission.
 - The microphone is built in the same place as the speaker.
- ⑪ **Hi/Low switch**
 - Used to adjust the transmission output.
 - At Hi position, the output power is 1 W. At Low position, the output power is about 150 mW.
- ⑫ **TX offset switch (TH-21A/AT)**
 - "+" Transmit frequency is 600 kHz higher than the receive frequency.
 - "-" Transmit frequency is 600 kHz lower than the receive frequency.
 - "S" Transmit and receive frequency are the same. (Also known as "Simplex".)
- TX offset switch (TH-21E)**
 - Shifts the transmit frequency for repeater operation.
 - "S" Simplex (receive and transmit frequencies are the same).
 - "REV" Sets the receive frequency 600 kHz lower than the frequency set by the thumb wheel switches.
 - "-" Switches the transmit frequency down 600 kHz from the receive frequency.

Operation

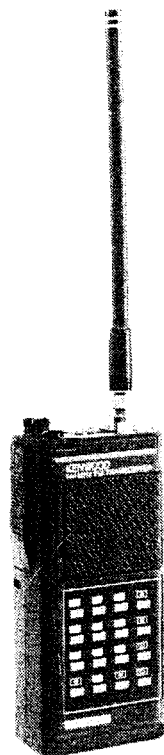
1. Reception

- Turn the VOL control to the right to supply power, and adjust the volume control to the desired level.
- Adjust the squelch control clockwise until the background noise just quiets.
- Adjust the frequency switches to the desired receive frequency.

2. Transmission

- Select the desired transmit offset.
- Check to see that the frequency is not busy.
- Press the PTT switch and speak into the microphone. The ON AIR indicator will light.

Note: The distance between the microphone and your mouth is 5 – 10 cm.



DTMF Key Pad Operation (TH-21AT only)

1. To operate the keyboard as a DTMF key pad press the PTT switch and dial the desired number.
2. After the first number has been entered the radio will remain keyed for approximately 1.5 seconds, thus allowing the release of the PTT switch.

Specifications

General

Frequency range	: 144 MHz – 146 MHz (TH-21E) 144 MHz – 148 MHz (TH-21A/AT) Note: Oceania Version 144 MHz – 146 MHz
Signal type	: F3 (FM)
Operating temperature	: $-20^{\circ}\text{C} \sim +50^{\circ}\text{C}$
Antenna impedance	: 50Ω
Power supply voltage	: 5.8V – 10.0V (rating voltage; 7.2V)
Power consumption	: At reception standby; Less than 28 mA At transmission (Hi); Less than 600 mA (Low); About 300 mA
Dimensions	: (W) 57 (65.5) x (H) 120 (127.5) x (D) 28 (32) mm The numbers in the parenthesis include projections.
Weight	: Approx. 280 g (including antenna and Ni-Cd batteries)

Transmitter section

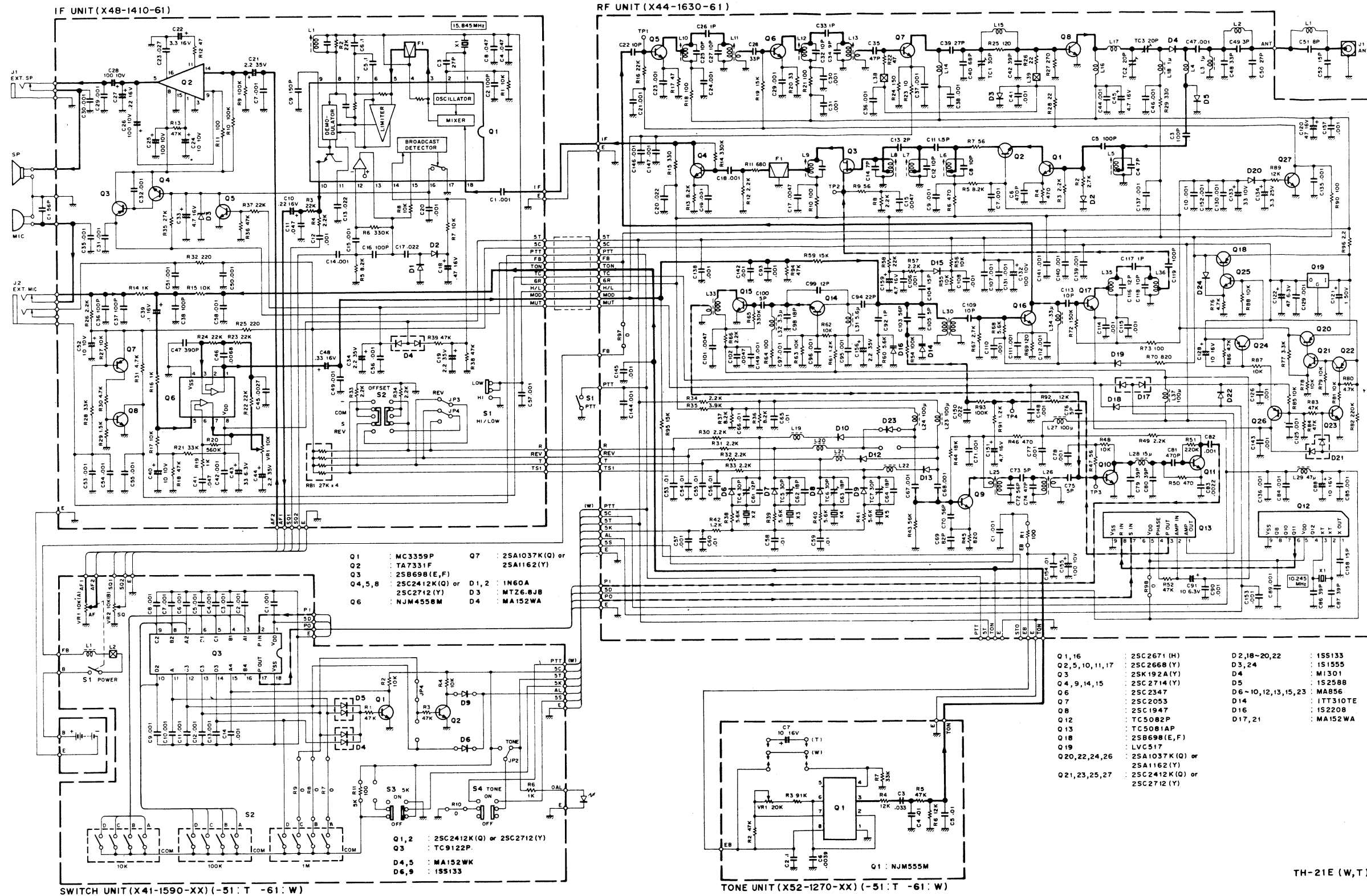
Output power	: Hi; 1.0W, Low; approx. 150 mW
Modulation system	: Reactance modulation
Max. frequency deviation:	± 5 kHz
Unwanted reflection	: Less than -60 dB
Microphone	: Condenser type

Receiver section

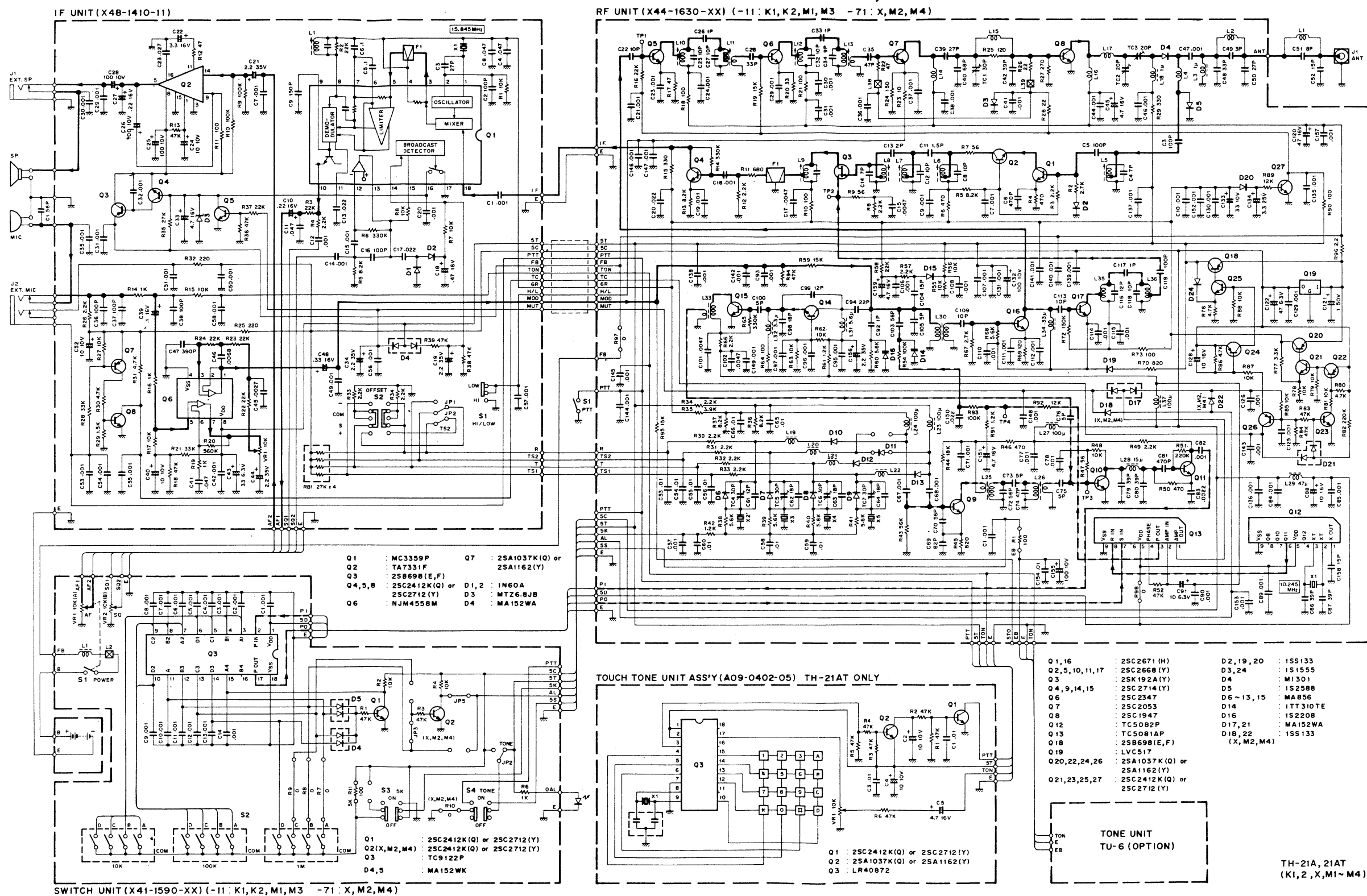
Reception system	: Double superheterodyne
Intermediate frequency	: 1st; 16.3 MHz, 2nd; 455 kHz
Sensitivity	: S/N more than 28 dB at $-6\text{dB}\mu$ ($0.5\text{ }\mu\text{V}$) input 12 dB SINAD; less than $-12\text{ dB}\mu$ ($0.25\text{ }\mu\text{V}$)
Squelch sensitivity	: Less than $0.25\text{ }\mu\text{V}$
Selectivity	: -6 dB at more than 12 kHz -40 dB at less than 28 kHz
AF output	: More than 250 mW (8Ω load, distortion 10%)

Design and specifications subject to change without notice.

TH-21 SCHEMATIC DIAGRAM



TH-21 SCHEMATIC DIAGRAM

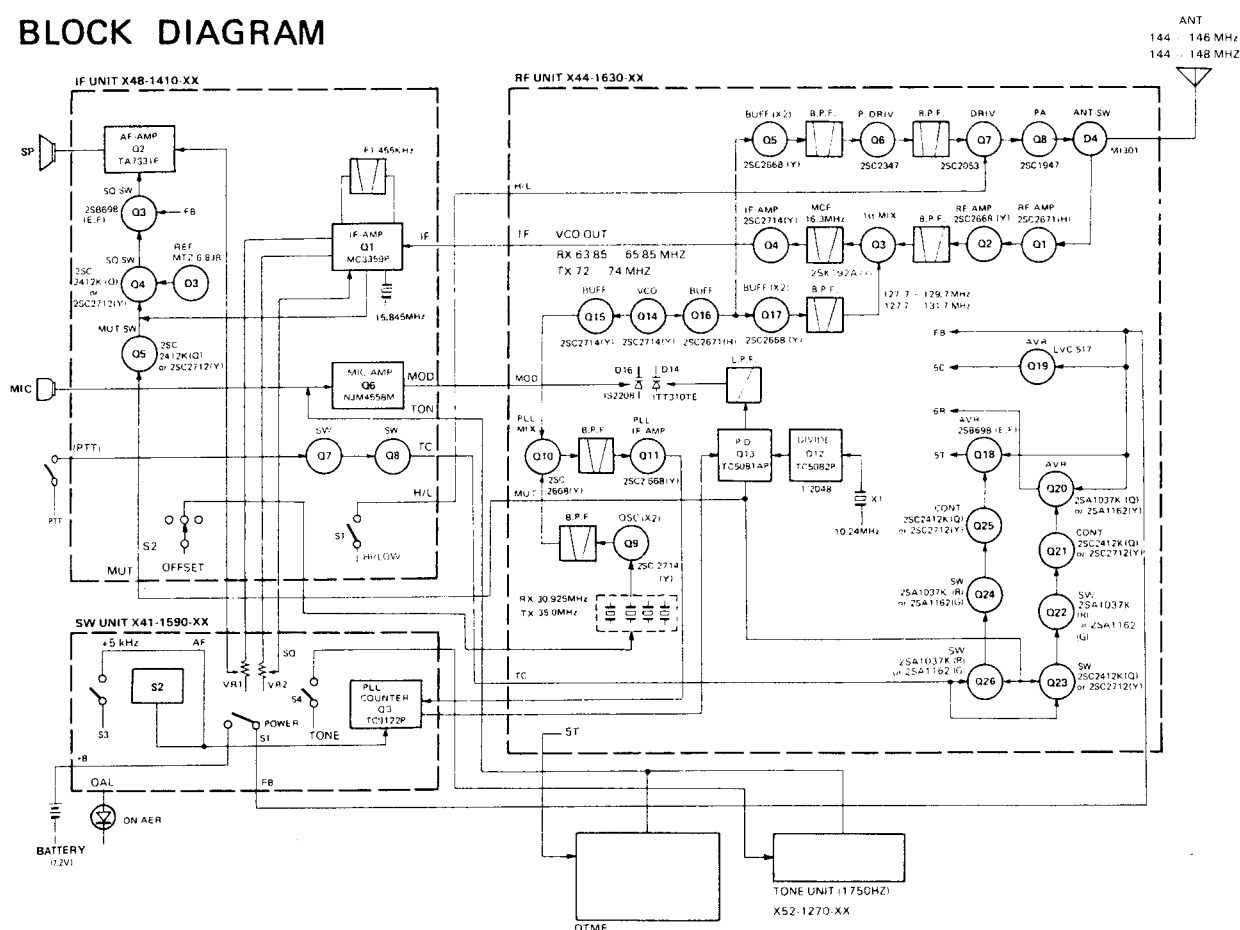


Optional Accessories

The following optional accessories are available for the TH-21.

- ① Rechargeable Ni-Cd battery pack PB-21
- ② Manganese battery case BT-2
- ③ SUM-2 battery case (for extended operation)..... EB-2
- ④ DC-DC power supply (for mobile operation)..... DC-21
- ⑤ External speaker/microphone..... SMC-30
- ⑥ Headset with VOX..... HMC-1
- ⑦ Soft carrying case..... SC-8
- ⑧ Earphone..... HS-8
- ⑨ Antenna conversion plug (twist lock to BNC) AJ-3
- ⑩ Tone unit..... TU-6

BLOCK DIAGRAM



TRIO-KENWOOD CORPORATION

Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

TRIO-KENWOOD COMMUNICATIONS

1111 West Walnut Street, Compton, California 90220, U.S.A.

TRIO-KENWOOD COMMUNICATIONS

DIVISION OF TRIO-KENWOOD ELECTRONICS, GmbH

D-6374 Steinbach-TS, Industriestrasse 8A West Germany

TRIO-KENWOOD ELECTRONICS, N.V.

Leuvensesteenweg 504 B-1930 Zaventem, Belgium

TRIO-KENWOOD (AUSTRALIA) PTY. LTD. (INCORPORATED IN N.S.W.)

4E, Woodcock Place, Lane Cove, N.S.W. 2066, Australia